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MICHAEL O. SCHEINBERG			EXAMINER	
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

### Office Action Summary

**Application No.**

10/716,181

**Applicant(s)**

NADEAU ET AL.

**Examiner**

Rodney G. McDonald

**Art Unit**

1795

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☐ Claim(s) \_\_\_\_ is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☐ Claim(s) \_\_\_\_ is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_.

**DETAILED ACTION**

***Election/Restrictions***

This application contains claims 40 and 41 drawn to an invention nonelected. A complete reply to the final rejection must include cancellation of nonelected claims or other appropriate action (37 CFR 1.144) See MPEP § 821.01.

***Claim Rejections - 35 USC § 112***

Claims 1-39 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1, line 4, is indefinite because "closely" is a relative term that lacks basis for comparison.

Claim 2, line 2, is indefinite because "closely" is a relative term that lacks basis for comparison.

Claim 3, line 2, is indefinite because "slightly" is a relative term that lacks basis for comparison.

Claim 4, line 2, is indefinite because "closely" is a relative term that lacks basis for comparison.

Claim 5, line 2, is indefinite because "slightly" is a relative term that lacks basis for comparison.

Claim 9, line 4, is indefinite because "closely" is a relative term that lacks basis for comparison.

Claim 10, line 2, is indefinite because "closely" is a relative term that lacks basis for comparison.

Claim 12, line 2, is indefinite because "closely" is a relative term that lacks basis for comparison.

Claim 15, line 4, is indefinite because "closely" is a relative term that lacks basis for comparison.

Claim 16, line 2, is indefinite because "closely" is a relative term that lacks basis for comparison.

Claim 17, line 2, is indefinite because "slightly" is a relative term that lacks basis for comparison.

Claim 18, line 2, is indefinite because "closely" is a relative term that lacks basis for comparison.

Claim 19, line 2, is indefinite because ""slightly" is a relative term that lacks basis for comparison.

Claim 26, line 3, is indefinite because "closely" is a relative term that lacks basis for comparison.

Claim 27, line 3, is indefinite because "slightly" is a relative term that lacks basis for comparison.

Claim 28, line 3, is indefinite because "closely" is a relative term that lacks basis for comparison.

Claim 29, line 3, is indefinite because ""slightly" is a relative term that lacks basis for comparison.

Claim 30, line 4, is indefinite because "closely" is a relative term that lacks basis for comparison.

Claim 31, line 3, is indefinite because "closely" is a relative term that lacks basis for comparison.

Claim 32, line 3, is indefinite because "closely" is a relative term that lacks basis for comparison.

Claim 34, line 3, is indefinite because "closely" is a relative term that lacks basis for comparison.

Claim 35, line 3, is indefinite because "closely" is a relative term that lacks basis for comparison.

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1 and 4-7 are rejected under 35 U.S.C. 102(b) as being anticipated by Tao et al. (U.S. Pat. 5,874,010).

Regarding claim 1, Tao et al. teach a method of exposing a planar cross-section of a structure composed of a first material. (Fig. 1c, Fig. 1d) The method comprises depositing a layer of a second material on the structure. The second material having mill rates at a higher incidence angles that closely approximate the mill rates of the first material at those incidence angles. (Column 3 lines 66-67; Column 4 lines 1-7; Column

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4 lines 37-64) An ion beam is directed at the structure. (Column 4 lines 20-36) Milling the structure in order to expose a cross-section of the structure thereby producing a uniformly planar face on the exposed cross-section. (Column 4 lines 20-36; Column 5 lines 1-19)

Regarding claim 4, the tungsten would have mill rates at incidence angles greater than 45 degrees that closely approximate the mill rates of the first material at incidence angles greater than 45 degrees. (Column 4 lines 37-64)

Regarding claim 5, the tungsten would have mill rates at incidence angles greater than 45 degrees that are equal to or slightly greater than the mill rates of the first material at incidence angles greater than 45 degrees. (Column 4 lines 37-64)

Regarding claim 6, the structure comprises a write-head for a magnetic disk system. (See Abstract)

Regarding claim 7, the first material comprises an alloy of Ni and Fe. (Column 3 lines 36-37)

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein

were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 2, 3, 8-14, 24-38 and 42-46 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tao et al. (U.S. Pat. 5,874,010) in view of Hong et al. (U.S. Pat 6,198,608).

Tao et al. is discussed above and all is as applies above. (See Tao et al. discussed above)

The differences between Tao et al. and the present claims is that the second material having a mill rate at incidence angles greater than 75 degrees that closely approximate the mill rates of the first material at incidence angles greater than 75 degrees is not discussed (Claims 2, 10), that the second material having a mill rate at incidence angles greater than 75 degrees that are equal to or slightly greater than mill rates of the first material at incidence angles greater than 75 degrees (Claims 3, 11), the second material being carbon is not discussed (Claims 8, 14), producing a non-planar face is not discussed (Claims 9, 14), the determination steps and selecting steps are not discussed (Claims 24-38, 42), the second material having a mill rate at incidence angles greater than 75 degrees that closely approximate the mill rates of the first material at incidence angles greater than 75 degrees is not discussed (Claim 43), that the second material having a mill rate at incidence angles greater than 75 degrees that are equal to

or slightly greater than mill rates of the first material at incidence angles greater than 75 degrees is not discussed (Claim 44), the second material has mill rates at incidence angles greater than 45 degrees that approximate the mill rates of the first material at incidence angles greater than 45 degrees is not discussed (Claim 45) and the second material has mill rates at incidence angles greater than 45 degrees that are equal to or greater than the mill rates of the first material at incidence angles greater than 45 degrees is not discussed (Claim 46).

Regarding claims 2, 3, 8, 10, 11, Hong et al. teach that the second material can be DLC (i.e. carbon) used in place of TiC or TaC. (Column 5 lines 28-37)

Regarding claims 9, 14, since Tao et al. teach utilizing different materials selection of the different materials with the different etching rates would result in a non-planar cross-sectional face. (See Tao et al. discussed above)

Regarding claim 12, Tao et al. already discuss the tungsten would have mill rates at incidence angles greater than 45 degrees that closely approximate the mill rates of the first material at incidence angles greater than 45 degrees. (Column 4 lines 37-64)

Regarding claim 13, Tao et al. already discuss the tungsten would have mill rates at incidence angles greater than 45 degrees that are equal to or slightly greater than the mill rates of the first material at incidence angles greater than 45 degrees. (Column 4 lines 37-64)

The motivation for utilizing the features of Hong et al. is that it allows for utilizing a low milling rate material. (Column 4 lines 62-65)



Regarding claims 24-38, 42, Tao et al. and Hong et al. discuss the steps except for the determining steps. However, by selection of the layers in Tao et al. one determines what layers to select and each layer has its own etching characteristics. (See Tao et al. and Hong et al. discussed above; Tao et al. Table)

Regarding claims 43, 44, Hong et al. teach that the second material can be DLC (i.e. carbon) used in place of TiC or TaC. (Column 5 lines 28-37)

Regarding claim 45, Tao et al. teach the tungsten would have mill rates at incidence angles greater than 45 degrees that closely approximate the mill rates of the first material at incidence angles greater than 45 degrees. (Column 4 lines 37-64)

Regarding claim 46, Tao et al. teach the tungsten would have mill rates at incidence angles greater than 45 degrees that are equal to or slightly greater than the mill rates of the first material at incidence angles greater than 45 degrees. (Column 4 lines 37-64)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the features of Tao et al. by utilizing the features of Hong et al. because it allows utilizing a low milling rate material.

Claims 15-23 and 39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tao et al. in view of Hong et al. and further in view of Tasker et al. (WO 03/019523 A1).

Regarding claim 15, Tao et al. is discussed above and teach a first material (i.e. NiFe) with a second material (i.e. refractory metals) deposited on the first material. The second material has a mill rate at higher incidence angles that closely approximate the

mill rates of the first material at those incident angles. Tao et al. teach directing an ion beam at the structure in order to expose a planar cross-section of the structure and the layer of second material. (See Tao et al. discussed above)

Regarding claims 17, 19, the tungsten of Tao et al. would have mill rates at incidence angles greater than 45 degrees that are equal to or slightly greater than the mill rates of the first material at incidence angles greater than 45 degrees. (Tao et al. Column 4 lines 37-64)

Regarding claims 18, the tungsten of Tao et al. would have mill rates at incidence angles greater than 45 degrees that closely approximate the mill rates of the first material at incidence angles greater than 45 degrees. (Tao et al. Column 4 lines 37-64)

Regarding claim 20, Tao et al. teach the first material comprises an alloy of Ni and Fe. (Column 3 lines 36-37)

The differences not yet discussed is directing an electron beam at the planar cross section, determining the edge positions for the desired dimensions of the cross section and determining the distance between the edge positions (Claim 15), the second material having a mill rate at incidence angles greater than 75 degrees that closely approximate the mill rates of the first material at incidence angles greater than 75 degrees is not discussed (Claim 16), the second material comprising carbon is not discussed (Claims 21, 39), utilizing focused ion beam milling is not discussed (Claim 22), determining the edge positions on a cross-section comprising forming an image of the cross-section on an image forming device and applying an algorithm to assign an edge position based upon grey-level variations (Claim 23) and directing a charged

particle beam at the structure in order to expose a planar cross-section, directing an electron beam at the cross-section and measuring the width of the structure cross-section is not discussed (Claim 39).

Regarding directing an electron beam at the planar cross section, determining the edge positions for the desired dimensions of the cross section and determining the distance between the edge positions (Claim 15), Tasker et al. teach directing an electron beam at the planar cross section. (Tasker et al. Paragraph 1030, 1031) Determining the edge positions for the desired dimensions of the cross section. (Tasker et al. Paragraph 1031) Determining the distance the distance between the edge positions. (Tasker et al. Paragraph 1031)

Regarding claims 16, 21, 39, Hong et al. teach that the second material can comprise carbon. (Hong et al. Column 5 lines 28-37)

Regarding claim 22, Tasker et al. teach utilizing focused ion beam milling to expose a cross section. (Tasker et al. Paragraph 1031)

Regarding claim 23, Tasker et al. teach determining the edge positions on a cross-section comprising forming an image of the cross-section on an image forming device and applying an algorithm to assign an edge position based upon grey-level variations. (Tasker et al. Paragraph 1027; 1031-1032)

Regarding claim 39, Tasker et al. teach ion beam milling to expose a cross section. (Tasker et al. Paragraph 1030) Directing an electron beam at the cross-section. (Tasker et al. Paragraph 1031) Measuring the width of the structure. (Tasker et al. Paragraph 1003)

The motivation for utilizing the features of Tasker et al. is that it allows for measuring feature shape. (See Tasker et al. Abstract)

The motivation for utilizing the features of Hong et al. is that it allows for utilizing a low rate etching material. (See Hong et al. discussed above)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified Tao et al. by utilizing the features of Hong et al. and Tasker et al. because it allows for measuring feature shape and for providing a low rate etch material.

***Response to Arguments***

Applicant's arguments filed January 17, 2008 have been fully considered but they are not persuasive.

***Response to the arguments of the claims rejected under 35 U.S.C. 112:***

In response to the argument that "closely" is definite because "closely" is a term of degree, it is argued that the metes and bounds of the term "closely" is unclear. It is unclear how close the mill rate of the second material needs to approximate the first material. Assuming the same argument was intended for the term "slightly", it is argued that the metes and bounds of "slightly" is unclear. It is unclear how "slight" the mill rate of the second material are to the first material.

***Response to the arguments of the claims rejected under 35 U.S.C. 102 as anticipated over Tao et al.:***

In response to the argument that Tao does not teach "matching" the milling rates of the overcoat and the substrate as required by Applicant's claims, it is argued that Tao

teach depositing a first layer and a second layer where the etch rates of the layers "closely approximate" each other. The claims do not require "matching" but only "closely approximating". The layers are etched to produce a uniform planar face on a cross section of the layers. (See Tao discussed above; for uniform cross sectional face see Fig. 1c)

In response to the argument that Tao would not produce a uniformly planar face on the cross-section as required by Applicant's claims, it is argued that in Fig. 1c Tao et al. teach producing a uniform cross sectional face where the layers are even with each other. (See Tao et al. discussed above)

***Response to the arguments of the claims rejected under 35 U.S.C. 103 as obvious over Tao et al. in view of Hong et al.:***

In response to the argument that Hong et al. does not teach "matching" the milling rates of the overcoat and the substrate as required by Applicant's claims, it is argued that the primary reference to Tao et al. teach depositing a first layer and a second layer where the etch rates of the layers "closely approximate" each other. The claims do not require "matching" but only "closely approximating". The layers are etched to produce a uniform planar face on a cross section of the layers. (See Tao discussed above; for uniform cross sectional face see Fig. 1c)

In response to the argument that Tao et al.'s teaching would not produce the desired topography of the cross-section face, it is argued that Applicant require producing a uniform cross sectional face topography and Tao et al. show in Fig. 1c

production of a uniform cross section face topography. (See Tao et al. discussed above)

In response to the argument that Hong et al. does not teach utilizing a layer of carbon, it is argued that Hong et al. teach utilizing TiC or TaC as the cap layer 70 but other layers show as DLC (diamond like carbon) can be used as this layer. (See Hong et al. Column 5 lines 28-37)

In response to the argument that there is not motivation for combining Hong et al. with Tao et al., it is argued that the motivation for combining Hong et al. with Tao et al. is that it allows for controlling the etch rate of the various deposited layers. (See Hong et al. and Tao et al. discussed above)

***Response to the arguments of the claims rejected under 35 U.S.C. 103 as obvious over Tao et al. in view of Hong et al. and further in view of Tasker et al.:***

Applicant has stated that the U.S. Pat. 6,889,113 to Tasker et al. is commonly owned and therefore should not be applied as prior art. The Examiner now applies WO 03/019523 A1 under 35 U.S.C. 102(a)/35 U.S.C. 103 to the claims.

This action will be NON-FINAL based on the newly cited reference.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Rodney G. McDonald whose telephone number is 571-272-1340. The examiner can normally be reached on M-Th with every Friday off..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam X. Nguyen can be reached on 571-272-1342. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Rodney G. McDonald/  
Primary Examiner, Art Unit 1795

Rodney G. McDonald  
Primary Examiner  
Art Unit 1795

RM  
May 8, 2008